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ABSTRACT

The comprehension and production of pantomimes on the part of 3- and 5-year-olds and nonneurologically impaired adults was studied. In a comprehension task, subjects watched a videotape of a woman performing 3 training pantomimes and 8 test pantomimes and then explained what the woman was pretending to do. The test pantomimes included 4 pantomimes representing an object as a body part (BPO) and 4 with symbolic object representation. An example of BPO representation is the use of a finger as a toothbrush. In symbolic object representation, the mimer pretends to hold a toothbrush. Results indicated that the BPO response reflects a conceptual difficulty that young children have with the symbolic representation of objects. In contrast to the adults, the children produced a significant number of BPO responses. Three-year-olds correctly labelled pantomimes with BPO representations significantly more often than symbolic object pantomimes. Children seemed to have difficulty in specifying the actions conceptually and were helped by the presence of a body part in their efforts to disambiguate similar actions and objects. Findings are discussed in the context of children's increasing independence from concrete environmental support in regards to their knowledge about actions and objects. (RH)

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USING REPRESENTATIONS: COMPREHENSION AND PRODUCTION OF ACTIONS WITH IMAGINED OBJECTS

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Poster presented at the Biennial Meeting of the Society for Research in Child Development, Seattle WA, April 1991

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ABSTRACT

Previous research into the relationship between symbolic capacity and the ability to perform actions with objects suggests that young children have difficulty producing actions with objects that are imagined (pantomimes): they frequently substitute a body part to represent the object involved in the action. Certain neurologically-impaired adults also produce body-part-as-object responses. In addition, some of these patients have difficulty correctly identifying symbolic object representations in pantomime comprehension tasks, and this has been taken as evidence of a deficit in the formation, and not the retrieval of the internal representation. The current study examined the comprehension and production of pantomimes in 3-year-olds, 5-year-olds and non-neurologically-impaired adults. Results indicate that the body-part-as-object response does reflect a conceptual difficulty young children have with the symbolic representation of objects. The children, in contrast to the adults, produced significant amounts of body-part-as-object responses, and the 3-year-olds correctly labelled pantomimes with body-part-as-object representations significantly more often than symbolic object pantomimes. The children seem to have difficulty precisely specifying the actions conceptually, and are helped by the presence of a body part in disambiguating similar actions and objects. These findings are discussed in the context of children's increasing independence from concrete, external environmental support in their knowledge about actions and objects.

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BACKGROUND

Theorists considering the development of representational thought have discussed the relationship between symbolic capacity and the ability to perform actions with objects. Previous research suggests that young children have difficulty producing actions with objects that are imagined (pantomimes) and frequently substitute a body part to represent the object involved in the action. For example, young children pretend that their finger is a toothbrush, and move it back and forth in front of their teeth.

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Older children, and presumably normal adults, pretend to hold a toothbrush.

This pantomime production difficulty has been interpreted as a conceptual problem in the symbolic representation of actions and objects. Overton and Jackson (1973) proposed that the body-part-as-object (BPO) response was part of the development of pretend play with objects. Initially, the functions, or meanings, attached to an object are directly tied to that object. Eventually, these meanings become less intrinsically connected to the objects, and actions can be evoked by an internal representation. With development, fewer defining characteristics of the object are necessary to evoke the appropriate actions. Before children have completely dissassociated the meaning from the presence of the the physical object, they recruit a body part to represent the object.

Certain neurologically-impaired adults also produce BPO responses, and have difficulty correctly identifying symbolic objects in pantomime comprehension tasks. This finding has been taken as evidence of a deficit in the formation, and not the retrieval, of the internal representation. Little is currently known about young children's pantomime comprehension ability, and the present study addresses this. Such knowledge is crucial before assuming that young children's pantomime performance reflects a true conceptual difficulty, and not just a retrieval or production one.

AIMS

The present study investigated the nature of children's body-part-as-object usage with both a pantomime production and a pantomime comprehension task. Children viewed pantomimes with and without BPO substitutions to determine if pantomimes which involve a body part representation for the object were easier to comprehend. If they are, then we have evidence that the BPO error previously observed in children's pantomime production reflects a true conceptual difficulty with symbolic object representation. A pantomime production task was also included in order to replicate previous research showing BPO usage in young children.

Any errors that were made in comprehension were also examined. Were BPO representations interpreted as BPO representations, but an incorrect object or action identified? What types of errors were made on the items with symbolic object representations?

Non-neurologically-impaired adults were also included in the study. Although it has been assumed that normal adults can comprehend and produce symbolic object responses, this assumption has come under question recently. While some researchers have found little BPO responding in normal adults, a recent study by Duffy & Duffy (1989) found similar levels of BPO responses in

normal adults compared to both left and right hemisphere damaged adults.

METHOD

Twenty-four 3-year-olds, 24 5-year-olds and 24 college students enrolled in an introductory psychology course were included in the study. Subjects participated in both a pantomime comprehension task and a pantomime production task. The children were given the tasks in two sessions, not more than one week apart. The adults were given both tasks in a single session.

Pantomime comprehension was always administered first in order to minimize the influence of the tasks on one another. In comprehension, subjects watched a woman on videotape perform 3 training and 8 test items, and were then asked to say what she was pretending to do. The 8 test items included 4 pantomimes presented with BPO representation and 4 pantomimes with symbolic object representation. The 8 test items were unlock a door, hammer a nail, saw some wood, stir some batter, comb hair, brush teeth, hit a baseball, and cut some paper.

Each subject viewed one of 2 item sets characterized by which items had BPO and which had symbolic object representation. In one set, a given item had BPO representation, and in the other set it was symbolic object present. For example, in one set brushing teeth was performed with the finger extended as the toothbrush (BPO present), and in the other set, the videotape showed the female adult pretending to hold a toothbrush while performing the action.

In pantomime production, subjects were asked to pretend to do the same 3 training and 8 test pantomimes they had seen in the comprehension task. Responses in the production task were videotaped. Finally, the children were administered the real objects task where they observed a videotape of the woman doing the 8 actions with real objects to ensure that errors in the pantomime tasks were not due to unfamiliarity with the actions.

RESULTS

PANTOMIME COMPREHENSION

A 3 age x 2 object representation type repeated measure ANOVA revealed a significant age by object representation type interaction, $F(2,69) = 10.18$, $p < .001$ (see Figure 1.). Post hoc comparisons showed that the 3-year-olds were better at labelling BPO pantomimes than symbolic object pantomimes ($p < .05$, by Newman-Keuls). Five-year-olds labelled the two types of pantomimes equally well. Adults were better at identifying pantomimes with symbolic object representations than body part representations ($p < .01$, by Newman-Keuls).

The results of examining individual scores in the comprehension data were generally consistent with the results of the ANOVA for the adults and the 5-year-olds, but for the 3-year-olds were more revealing of variation than the significant difference between BPO and symbolic object scores on the post hoc test suggested. In particular, seven 3-year-olds did better on symbolic object pantomimes than they did on BPO pantomimes. The data were therefore further examined by asking how many subjects in an age group showed consistent ability to correctly label each of the two types of pantomimes (i.e. gave 3 out of 4 or 2 out of 3 correct responses to BPO compared to symbolic object pantomimes). Table 1 indicates that if 3-year-olds are consistently correct on any type of pantomime, it is more likely that they are consistently correct on BPO pantomimes than on symbolic object pantomimes.

COMPREHENSION ERRORS

Examination of the errors made in comprehension showed that to BPO pantomimes, 3- and 5-year-olds made a variety of types of responses, including being off task (41% and 25% of the time respectively, for the 3-year-olds and 5-year-olds), interpreting the body part as an object (9% and 25% respectively), and not interpreting the body part as an object (18% and 38% respectively). Adults, for the most part, did not interpret the body part as an object (76% of their error labels were of this type). When incorrectly labelling pantomimes with symbolic object representations all age groups tended to label actions that involved symbolic objects (40%, 78% and 100% of the time respectively for the 3-year-olds, 5-year-olds and adults).

In addition, children's errors often indicated a confusion between actions that were similar in form. For example, stirring some batter was called "drawing a circle", and sawing some wood was called "beeping a horn". The movements involved in the action named in the error label were similar to those involved in the target action.

PANTOMIME PRODUCTION

Table 2 shows the percentages of type of object representation in the pantomime production task by age. Results from a one-way ANOVA on percentages of BPO responses showed a significant effect of age, $F(2,69) = 15.48$, $p < .001$. Post hoc tests revealed that the 3- and 5-year-olds produced more BPO pantomimes than the adults, but did not differ from each other ($p < .01$, by Newman-Keuls). Results from a one-way ANOVA on percentages of symbolic object responses showed a significant effect of age, $F(2,69) = 33.82$, $p < .001$. Post hoc tests revealed that the 3- and 5-year-olds produced significantly fewer symbolic object pantomimes than the adults, and the 3-year-olds produced fewer symbolic object pantomimes than the 5-year-olds ($p < .01$, by Newman-Keuls).

CONCLUSIONS

The results of this study indicate generally that the BPO response, previously noted in the pantomime production of young children and replicated here, reflects a conceptual difficulty with symbolic representation of pretend objects, and is not just a production problem. Three-year-olds showed a marginal, but real, differential ability in comprehending BPO and symbolic object pantomimes.

It is also true, however, that while 3-year-olds were helped by the presence of a body part when labelling pantomimes, they still frequently labelled an action that involved symbolic objects when incorrectly identifying a pantomime. The children appear to have an internal representation of the actions, which may not differ significantly in form from those of the adults. However, the representations are not as fully elaborated or accessible as those of the adults. The children seem to have difficulty in specifying the actions conceptually, and are helped by the presence of a body part in disambiguating similar actions and objects. Concreteness in the form of the body part is beneficial in establishing the details of the action. This explanation of the BPO response fits nicely with previous descriptions of both the development of object use given in the developmental literature on play, and the breakdown of the action system offered in the neuropsychological literature.

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Figure 1.
Mean Percentages of Correct Labels in the Pantomime Comprehension Task By Age and Object Representation Type

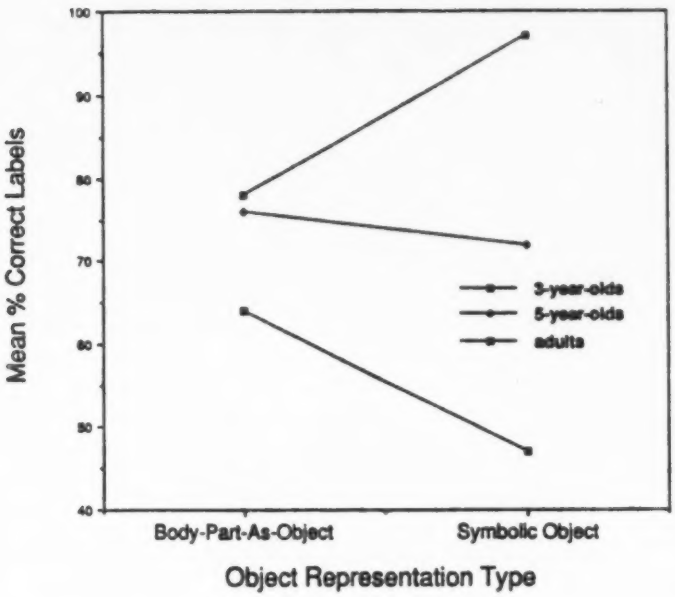

Table 1

Number of Subjects Who Were Consistently Correct in the Comprehension Task By Age and Type of Pantomime

	Age		
Type of Pantomime	3-year-olds	5-year-olds	Adults
Body-Part-As-Object and Symbolic Object	7	13	20
Body-Part-As-Object Only	10	3	0
Symbolic Object Only	1	6	4
Neither Type of Pantomime	6	2	0

Table 2

Mean Percentages of Type of Object Representation By Age in the Pantomime Production Task

	Age		
Type of Object Representation	3-year-olds	5-year-olds	Adults
Body-Part-As-Object Representation	44	40	13
Symbolic Object Representation	38	59	87
No Response	6	1	0
Unrecognizable Response	12	0	1

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